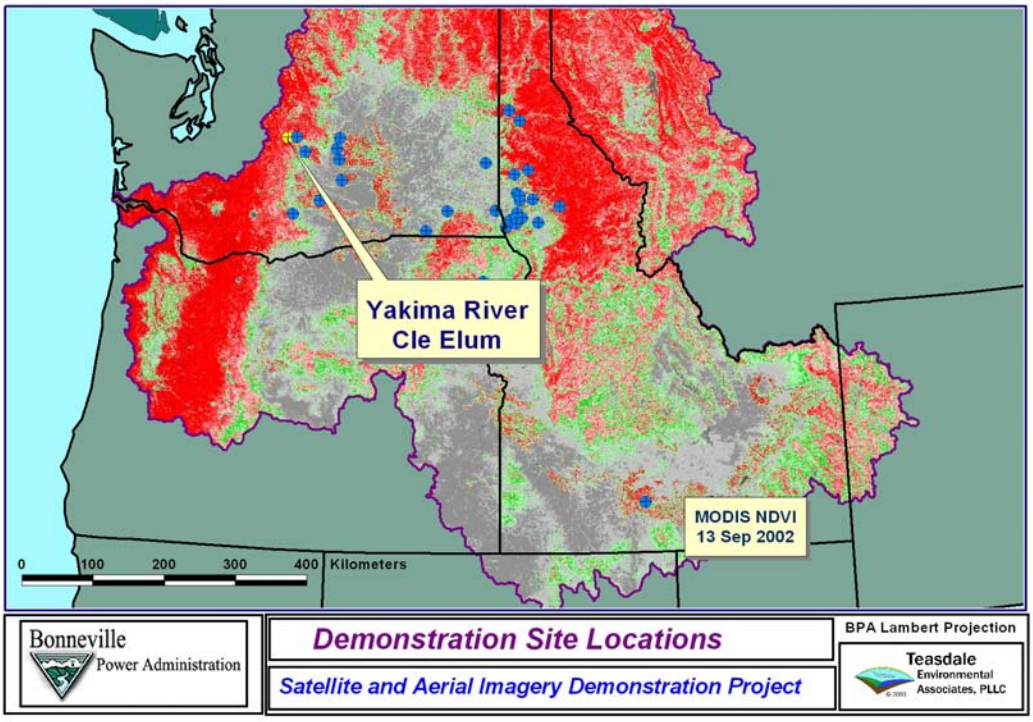
Yakima River - Cle Elum Demonstration Site	
Location	Kittitas County, WA Cle Elum, WA
Water body	Yakima River
Ecological Provenance	Columbia Plateau
Subbasin Name	Yakima
BPA Hydrologic Unit Code ID	2391
Hydrologic Unit Code, 6th Level	170300011002
Watershed Name	Upper Yakima, WA



Unique Characteristics

The upper Yakima River flows eastward from the Cascade Mountians into the plateau of the Columbia Basin and partially supplied by three lakes operated as irrigation storage reservoirs. The meandering reach at Cle Elum is relatively low gradient but carries high snowmelt flows and can transport a considerable suspended and bed sediment load. Partially forested riparian vegetation is well established in most locations and appears persistent. Residential development and transportation facility land uses occupy many locations of the accessible land near the stream. Side channel ponds support extensive macrophyte vegetation.

Satellite imagery for this site includes Landsat 5, Landsat 7, MTI, and ASTER. Digital color aerial imagery was acquired on May 31, 200 and October 15, 2002.

Ancillary data includes topographic DRG's, DOQ's, watershed boundaries and national land cover data. The imagery and supporting data reveal the characteristics of riparian vegetation, accumulations of large woody debris, stream channel morphology, stream improvement structures, and proximity of development.

Objective

The primary objective was to compare the capability of satellite and aerial imagery to detect and characterize macrophyte growth in floodplain ponds along the Yakima River. Secondary objectives were to compare spring and fall aerial imagery to observe indications of water quality variation, examine land use in the stream corridor, and observe seasonal changes in the temperature of Cle Elum Lake.

Results

The MTI high resolution satellite imagery and IKONOS satellite imagery both detected macrophyte beds in larger ponds. Satellite interpretations were confirmed with the very high resolution aerial imagery. Comparison of spring and fall aerial imagery showed the change in water surface area between high flow and low flow. River water in the spring image appeared more turbid than fall imagery. Water from the Teanaway River appeared less turbid than the Yakima River in the spring images.

All satellite imagery showed the ability to discriminate major land cove types (forest, open grass, urban, water). More detailed interpretations and classifications were possible with the MTI and IKONOS imagery. The multi season MTI imagery showed forest phenological changes and crop growth in the watershed.

The MTI thermal imagery produced a spectacular image of fall turnover (thermal mixing) of Cle Elum Lake. A summer MTI thermal image of the Lake showed "boat trails" indicating that the MTI sensor is capable of relatively fine discrimination of thermal gradients.